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ABSTRACT

Field work throughout Arkansas since 1971 and a search of museum records have yielded 35 collections of the ironcolor shiner, *Notropis chalybaeus* Cope (Cyprinidae), not previously documented in Arkansas. From these data the ironcolor shiner is considered to be confined to the Coastal Plain physiographic province of Arkansas below the Fall Line, becoming most abundant in the Ouachita and Red River drainages of southern Arkansas. Notes on habitat preference, species associates, and current status of *N. chalybaeus* within Arkansas are presented.

INTRODUCTION

The ironcolor shiner, *Notropis chalybaeus* Cope, is a small, distinctive cyprinid species which ranges from New Jersey west to eastern Texas and northward in the Mississippi Valley to Iowa and Indiana (Moore, 1968). Throughout this geographic region this species is generally locally abundant, although not necessarily widespread, in the area inhabited. *N. chalybaeus* was initially documented in Arkansas by Swift (1970) who listed four localities which did not appear in Buchanan's (1973) first published report of this species in the state. Recently Buchanan (1976) collected three specimens from the Arkansas River. During the present study 35 additional collections of this shiner have been made or documented from the state, including the four unpublished records of Swift (1970). In this report, new state distributional records for *N. chalybaeus* are given, previous museum collections are summarized, and comments regarding habitat preference, species associates, and current status of this shiner in Arkansas are presented.

METHODS AND MATERIALS

Most of the material used in this study is housed in the Southern Arkansas University Vertebrate Collection and was collected by the author and his students. Additional collections were gleaned from various museum records. Specific locality information is listed by county in the form of museum records. The museum catalog number is followed by the number of specimens (in parentheses) and brief locality data with survey coordinates when available. Material is listed using the following institutional abbreviations: FMNH - Field Museum of Natural History; FSU - Florida State University; NLU - Northeast Louisiana University; SAU - Southern Arkansas University; TU - Tulane University; and UAIC - University of Alabama Ichthyology Collection.

Physicochemical parameters used in determination of habitat preference were taken in accordance with standard methods (American Public Health Association, 1971) during the period 22 May 1974 through 8 October 1974 at two week intervals from lower Big Creek, a large tributary of Bayou Dorcheat (Red River drainage) approximately 9 mi. SE of Magnolia, at a county road bridge, 1 mi. SE of the junction of St. Hwy. 132 and county road (Sec. 9, R22W, T18S) in Columbia County, Arkansas. Additional information on habitat was derived from detailed field notes taken from 15 collections of *N. chalybaeus* made by the writer.

DISTRIBUTION

Failing to adequately sample the sluggish aquatic habitats of the Coastal Plain physiographic province in his initial treatise on Arkansas fishes, Black (1940) did not collect *N. chalybaeus* from the state. Later, more intensive collections of these lowland habitats were begun by the author and others. Reynolds (1971) conducted a survey of the fishes of the Saline River (Ouachita River system), but did not collect *N. chalybaeus*. A study of the main channel of the lower Ouachita River within Arkansas yielded 97 specimens from a single collection (Raymond, 1975). Investigation of Bayou Bartholomew (Thomas, 1976) in southeastern Arkansas established *N. chalybaeus* as a rather common inhabitant of that drainage as 67 specimens were collected from seven Arkansas localities.

Although not listed by Black (1940), the first specimens of *N. chalybaeus* collected in Arkansas according to Swift (1970) were evidently taken in Poinsett Co. from the St. Francis River, probably at Marked Tree, by Seth E. Meek and not initially from Big Cypress Bayou in Monroe County, Arkansas, by Buchanan (1974). Three collections predate those given by Buchanan (1974) including three specimens of *N. chalybaeus* collected from Departe Creek above George Hook Lake in Independence Co. on 20 April 1965 (TU 49957), along with six specimens taken from Cypress Creek at Ark. Hwy. 1, 7.3 mi. SW of Marvel, Phillips Co. on 6 June 1966 (FSU 14486) and 61 specimens collected from Big Cypress Creek at Ark. Hwy. 1, 12 mi. SW of Marvel on 8 June 1966 (FSU 14516).

Field work throughout southern Arkansas since 1971 and a search of museum records have yielded a total of 25 collections of *N. chalybaeus* representing 22 localities not previously reported by Buchanan (1974). This brings to 37 the total number of known collections of the ironcolor shiner from the state to date. These collections represent approximately 700 specimens.

Within Arkansas, *N. chalybaeus* has been taken only from the low to moderate gradient streams of the Coastal Plain physiographic province below the Fall Line (Fig. 1). Interestingly, other lowland species such as *Notropis fumeus* Evermann, *Etheostoma gracile* (Girard), and *E. proeliare* (Hay) with which *N. chalybaeus* has been taken syntopically have penetrated the Arkansas River Valley above the Fall Line where similar habitat is occasionally available; however, *N. chalybaeus* is noticeably absent from these streams.

A collection from Departe Creek, Independence County, represents the nearest occurrence of *N. chalybaeus* to the Fall Line within the state. Arkansas collections are available from the northern portion of the Coastal Plain province in Poinsett County from the St. Francis River southward to Bayou Bartholomew in southeastern Arkansas and west to the Little River system of southwestern Arkansas in Little River County where the species near its western terminus.

Listed below are the localities from which new records have been gathered. Localities are listed by county only once, although more than one collection may have come from that particular location.

POINSETT CO.: FMNH 2188 (3). St. Francis River at Marked Tree, Seth E. Meek (?). **INDEPENDENCE CO.**: TU 49957 (3). Departe Creek, above George Hook Lake. **PHILLIPS CO.**: FSU 14486 (6). Cypress Creek (Sec. 34, T2S, R1E). **MONROE CO.**: FSU 14516 (61). Big Cypress Creek (Sec. 5, T3S, R1E). UAIC 1009 (2). Flat Fork Creek (Sec. 21, T3N, R1W). **LINCOLN CO.**: NLU 311950 (4). Bayou Bartholomew (Sec. 1, T9S, R7W). NLU 31935 (5). Bayou Bartholomew (Secs. 22-23, T8S, R7W). **JEFFERSON CO.**: NLU 32023 (4) Bayou Bartholomew (Sec. 24, T7S, R9W). NLU 32017 (7). Bayou Bartholomew (Sec. 28, T6S, R9W). **DREW CO.**: NLU 31938 (26). Cut-off Creek (Sec. 11, T12S, R5W). NLU 31854 (4). Bayou Bartholomew (Sec. 35, T11S, R4W). **ASHLEY CO.**: NLU 32151 (12). Bayou Bartholomew (Sec. 1,

T19S, R4W). SAU Uncat. (84) Chem-a-haut Creek (Sec. 11, T19S, R7W). SAU Uncat. (67). West Creek (Sec. 8, T19S, R19W). **BRADLEY CO.:** NLU 31197 (97). Ouachita River at Moro Bay (Secs. 21-28, T16S, R12W). **COLUMBIA CO.:** SAU Uncat. (39). Bayou Dorcheat (Sec. 10, T19S, R22W). SAU Uncat. (8). Bayou Dorcheat (Sec. 4, T18S, R22W). SAU Uncat. (1). Bayou Dorcheat (Sec. 24, T17S, R23W). SAU Uncat. (92). Bayou Dorcheat (Sec. 9, T19S, R22W). SAU Uncat. (3). Big Creek (Sec. 10-15, T17S, R21W). SAU Uncat. (3). Bayou Dorcheat (Sec. 18, T16S, R22W). **SEVIER CO.:** NLU 29359 (1). Cossatot River (Sec. 20, T9S, R30W). **LITTLE RIVER CO.:** SAU Uncat. (16). Flat Creek (Sec. 21, T11S, R31W).

HABITAT

Fowler (1906) described the habitat of *Notropis chalybaeus abbotti* (Fowler) as "the little channels and runs in sphagnum banks." Greeley (1937) noted that *N. chalybaeus* was abundant in the weedy and sluggish portions of the Hackensack River in New York. Marshall (1947) presented the most extensive account of the life history and ecology of *N. chalybaeus* in Florida. Other cursory accounts of the habitat have been published by Miller and Robison (1973), Douglas (1974), and Pflieger (1975).

Because this species is quite common in nearby Big Creek (Red River drainage) (Columbia County) physicochemical data were collected to indicate the habitat requirements of *N. chalybaeus*. In addition, notes were made on similar habitats throughout southern Arkansas in Chem-a-haut Creek (Ashley County), Bayou Bartholomew (Drew Co.) and Flat Creek (Little River Co.) where this shiner was collected. In Arkansas, the ironcolor shiner was found primarily in acid, tannin-stained, nonturbid, sluggish Coastal Plain streams and rivers of low to moderate gradient. The swifter gradient streams and rivers of the Interior Highlands were conspicuously avoided. Streams where *N. chalybaeus* was common were typically of small to moderate size (10-30 ft. wide), approximately 3-4 ft. deep, with sand, mud, silt, or detritus substrates. Submerged and semi-aquatic vegetation *(Myriophyllum* spp., *Polygonum hydropiperoides* var. *opelosanum*, *Proserpinaca palustris* L.) was almost always abundant. Seining of thick vegetation near the edge of the main channel where current was reduced or absent often yielded specimens as schooling individuals seemed to prefer midwater portions of these stream areas. Stream banks along these areas were heavily wooded with riparian vegetation including bald cypress *(Taxodium distichum)*, willows *(Salix nigra* and *S. interior)*, beech *(Fagus grandifolia* var. *caroliniana)*, river birch *(Betula nigra)*, and red maple *(Acer rubrum)*. Consequently, the streams received significant shade from this heavy canopy which lowered stream temperatures.

Big Creek (Bayou Dorcheat drainage), where *N. chalybaeus* is fairly common, was characterized physicochemically by water temperatures ranging from near 0°C in winter months to 25°C in summer, dissolved oxygen values of 4.2-6.8 mg/1, pH of 6.2-6.7, carbon dioxide of 6.5-8.5 mg/1, BOD of 0.4-6.0 mg/1, chloride of 11.2-26.0 mg/1, alkalinity of 4-50 mg/1; dissolved solids of 93-150 mg/1, suspended solids of 5-42 mg/1, and discharge generally less than 65 ft^3/sec. Turbidity was generally less than 25 Jackson Turbidity Units although following periods of flooding in the fall and spring, values as high as 130 JTU were recorded. There is usually no prolonged period of turbid conditions in Big Creek. While the water is normally nonturbid, Big Creek has a quite darkly stained, reddish-brown hue imparted to the water by tannins leached from an abundance of organic matter in the stream. Interestingly, no specimens of *N. chalybaeus* were taken from small tributaries (3-5 ft. wide) or spring-fed feeder streams of the Bayou Dorcheat stream system.

Marshall (1947) indicated the suitability of a wide diversity of stream habitats for *N. chalybaeus* in Florida; however, such does not seem the case for this species in Arkansas where it was generally confined to habitat types as described above in all the locations where specimens were taken throughout southern Arkansas.

SPECIES ASSOCIATES

Common species associates of the ironcolor shiner in Arkansas include the grass pickerel, *Esox americanus* Leseuer; lake chubsucker, *Erimyzon sucetta* Lacepede; redfin shiner, *Notropis umbratilis cyanocephalus* (Copeland); ribbon shiner, *Notropis fumeus* Evermann; golden shiner, *Notemigonus crysoleucas* (Mitchill); banded pygmy sunfish, *Elassoma zonatum* Jordan; flier, *Centrarchus macropterus* Lacepede; spotted sunfish, *Lepomis punctatus* (Valenciennes); bantam sunfish, *Lepomis symmetricus* (Valenciennes); green sunfish, *Lepomis cyanellus* Rafinesque; dollar sunfish, *Lepomis marginatus* (Holbrook); mosquitofish, *Gambusia affinis;* slough darter, *Etheostoma gracile* (Girard); and the cypress darter, *Etheostoma proeliare* (Hay). In the Little River County in southwestern Arkansas, this species has been found with the blackspot shiner, *Notropis atrocaudalis* Evermann.

STATUS WITHIN ARKANSAS

A review of the status of *N. chalybaeus* in surrounding states revealed that in Louisiana *N. chalybaeus* was uncommon and sporadically distributed (Douglas, 1974) while Cook (1959) did not report this species in Mississippi. Pflieger (1976) reported that while not widespread, *N. chalybaeus* was locally abundant in Missouri. In Oklahoma, at the western edge of its range, Robison, et al. (1974) listed the ironcolor shiner as endangered. Within Arkansas the ironcolor shiner previously has been regarded as threatened by Buchanan (1974) and Robison (1974) due primarily to the paucity of collection localities and scarcity of specimens known from the state. New data gathered since 1974 provides an opportunity to reassess the status of *N. chalybaeus* in Arkansas.

A total of approximately 1000 collections of fishes by the author and his students were used in the assessment of the distribution and abundance of *N. chalybaeus*. Approximately half are from the Coastal Plain. From these collections 35 collections of the ironcolor shiner have been documented from Arkansas. These collections reveal a widespread, albeit spotty, occurrence of *N. chalybaeus* throughout the Coastal Plain province. Generally this species may be locally abundant, as in Bayou Dorcheat and Bayou Bartholomew, or exist as smaller populations in other areas of the Coastal Plain. Because the ironcolor shiner seems to show a predilection for relatively nonturbid, low gradient streams of the Coastal Plain, it may face an uncertain future in the state as eastern Arkansas is being drastically altered ecologically by man. Drainage of swampy areas in the Mississippi Alluvial Plain has been going on since the early 1900's (Holder, 1970). Clearing of prime timber land for production of soybeans is proceding at an alarming rate (Holder, 1970). Channelization and subsequent levee construction throughout eastern Arkansas is rapidly destroying lowland streams and associated oxbow lakes inhabited by *N. chalybaeus*. Perhaps the Ouachita River Basin (including Bayou Bartholomew) and the lower Red River drainage tributaries in southern Arkansas will eventually serve as important refugia for this species, sustaining sizeable populations. Unfortunately, these areas also are undergoing increased stress from agricultural alteration, pesticide runoff (endrin and toxaphene), oil field pollution, paper plant effluents, and now the uncertain spectre of lignite production in the Ouachita River Basin has appeared. Ultimate effects on these lowland ecosystems due to these environmental modifications and alterations are only speculative at this point.

Based on the new data, which reveals a more widespread distribution and greater abundance than was formerly believed, the status of *Notropis chalybaeus* in Arkansas seems to be best described as "uncommon" rather than threatened as has been the case in the past. Continued collection of the lowland, sluggish habitats of the Coastal Plain province will probably reveal additional populations, as yet undiscovered.

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